

DAILY SENTINEL

SATURDAY MORNING, JUNE 17.

The Atlantic Cable—Preparations on Board the Great Eastern—Scientific Tests.

The London Telegraph of May 23d has the following interesting account of the preparations on board the Great Eastern for laying the ocean telegraph cable:

DIFFERENCES BETWEEN 1858 AND 1865.

A visit was paid to the Great Eastern a few days since by a large party of the Directors' friends, and it may be said that all who understood the preparations which they saw came away with a greatly strengthened confidence in the future of the new cable. Since 1858, when the first Atlantic line was laid, the advance that has been made by the science of telegraphy has been such that the scientific world has been able to comprehend the phenomena which were involved in the laying of the cable. The instructions in common use were unsuited to receiving signals through a great length of cable; the necessity of providing for the conductor an insulation so perfect as to approach an absolute condition was inadequately appreciated. The best preliminary test for a long cable had not been devised, and the old Atlantic telegraph was laid without having been subjected to any searching test on shore. Every precaution had been taken concerning the management of the wire, but no one recommended the precautions which subsequent experience has shown to be necessary. When the signals began to fail the battery power was augmented, and the conductors were covered with coils, which rapidly helped on the destruction of the conductor, were put in circuit. No one thought of "nursing" the cable—of humoring its feeble attempts at articulate utterance, and of finding out what it said rather than listening to it. The cable was not called upon to speak, but to be constantly calling on it, in the language of the Victoria gallery, to "speak up."

The old cable, however, is dead and gone; part of it has been picked up and applied to igneous uses, as a race-horse past his work may be put into the shafts of a Henson; part of it has been abandoned, and lies where it may rest till the end of time, in the "dark unfathomed caves" of the deep sea. Let us turn to the practical present.

SCENES ON BOARD THE GREAT EASTERN.

The Great Eastern looks just now more like an engineer's workshop than a seagoing ship. The vast expanses of her deck are covered with wooden sheds and piles of timber. There are smaller sheds below, and between the decks you might fancy yourself in a machinery factory. The great engines of the ship, it is true, have lost the bright look of machinery which is in constant use, or in a trance. If you descend the ladders which lead to the boilers and furnaces, an expedition which is more like going down a mine than any other to which it can be compared—you find yourself in the midst of darkness, solitude, and cold; but in those regions of the vessel where the cable is being shipped and watched, there is every sign of keen, vigilant intelligence. When you understand what is being done, you see something more than this—that scientific foresight of the highest order directs every step; and that the thick tarry rope, coarse and rough to appearance, which lies coiled away under the water in the tanks of the ship, is manufactured, scanned, and tested with as much care as the finest optical instrument, or as the owner's observatory, or the most delicate apparatus of fragile glass ever applied to the careful experiments of chemistry.

THE SCIENTIFIC TEST.

It seems impossible that there can be any fault in the Atlantic cable. The Great Eastern gives us a lesson. To say nothing of the care applied to it at the manufactory, it is tested not only after it has been taken on board, but during its delivery into the ship. As soon as a length is brought alongside, and is connected with the coils already on board, and the other end with the instruments in the testing room. The circuit is thus made through the whole extent of the coil, the portion on board and the portion alongside. The process of heating the cable, and the insulation is continuously observed. The instruments in the testing room record the smallest deviation from absolute perfect insulation. It will be understood that an insulation which will be quite perfect, as a cable is put under stands the world, is not attainable. A piece of metal separated by means of the purest glass, and enclosed in the driest atmosphere that can be obtained, will, if charged with electricity, lose that electricity after a time. In the case of insulation we must, therefore, be understood to mean an approximate condition; but the approximation in the case of the new Atlantic cable comes so near to perfection that this rough way of saying it is a scientific wonder.

The last dying pulsation of the old Atlantic cable was forced through it by means of a galvanic battery consisting of two hundred and forty cells. The submarine telegraph from London to America is now in the hands of a battery of fifty cells, and such a battery is commonly used for the other submarine lines of Europe. Signals have been repeatedly sent through more than thirteen hundred miles of the cable now on board the ship, and the results are so good that the Atlantic cable is felt to be a reality, and might have been felt by the hand, and might have been passed barometrically through a circuit completed by the operator's tongue, can be used to convey messages along a length of cable that would never stretch from London to St. Petersburg. Over oceanic distances, such as those in ordinary use for land telegraphy, a current from one cell would be sufficient to send a message.

To record such faint pulsations of electricity it is necessary to use Professor Thompson's mirror of galvanometer. This beautiful instrument consists of a mirror about the size of a four-penny piece, made of microscope glass, and so thin that it weighs only a grain. On the back of this mirror a minute magnet is fixed, and thus supplemented, it is suspended in a coil of wire, so that any current passing through the coil deflects the magnet and the mirror along with it. A ray of light reflected by the mirror falls on a scale, distant about eighteen or twenty inches, and reveals its faintest movements. Different combinations of these movements represent the different letters of the alphabet, and thus the apparently erratic wanderings of a ray of light are made to convey intelligence. An instrument of this kind is constantly used to test the cable, as it is hauled on board; and if any fault be detected, it can be traced by the cable without detection. Up to this time, when there are on board the ship alongside 1,570 miles of cable, no fault has been discovered.

THE IMMERSION.

The machinery for paying out is not yet on board, but is being put together at the Green Works. The process of immersion will take about a fortnight. The beginning of the shore end will be laid by a small vessel, which will meet the Great Eastern about twenty miles from the Irish coast. The cable will then be hauled on board, connected with that in the great tanks, and the big ship will begin her voyage. To the uninitiated this process of cutting and joining the cable appears very mysterious, but the engineers, who are used to the work, do not regard it as anything but a matter of course. The joints do not really endanger either the insulation or the strength of the cable, as wherever they are made the external and conducting wires are spliced along a considerable length, and the gutta percha carefully put on in separate layers, firmly pressed together by means of warm iron. The completeness of the joint is tested by laying it in an insulated metal vessel containing water, and are raising, by means of tests applied to this vessel, whether any electricity escapes from the joint as a current is passed along the cable.

TOBACCO, TOBACCO.

A. S. MYERS. J. R. DRUMMOND.

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